



E-MRS Spring Meeting 2001
June 5 - 8, 2001

SYMPOSIUM O

Strains and Stresses in Materials - Origins, Analysis, Effects

Symposium Organizers:

B. EIGENMANN, Schnaittach-Hormersdorf, Germany

M. HÄRTING, University of Cape Town, South Africa

Papers will be published in Mechanics of Materials

E-MRS 2001 SPRING MEETING

SYMPOSIUM O

Tuesday, June 5, 2001
Mardi 5 juin 2001

Morning
Matin

Session I STRAINS IN SINGLE CRYSTALS

	8.45 – 9.00	WELCOME ADDRESS
O-I1	09:00	MECHANICAL PROPERTIES AND INTERNAL STRESSES IN GERMANIUM SINGLE CRYSTALS, <u>Corinne Charbonnier</u> , Tomas Kruml, Jean-Luc Martin, Département de Physique, Ecole Polytechnique Fédérale, 1015 Lausanne, Switzerland
O-I2	09:30	CANCELLED
O-I3	10:00	METHOD OF THE STRESS IMPOSING DURING THE MICROCRYSTALS CHARACTERIZATION AT CRYOGENIC TEMPERATURES, A.A. Druzhinin, <u>E.N. Lavitska</u> , I.I. Maryamova, Polytechnic University, Kotlarevsky Street 1, 79013 Ukraine and H.W. Kunert, University of Pretoria, 0002 Pretoria, South Africa
	10:30	BREAK
O-I4	10:30	CANCELLED
O-I5	11:00	CANCELLED
O-I6	12:00	SPIN-DEPENDENT RECOMBINATION IN STRAINED Si UNDER FIELDS OF 1-30 MHz RANGE, O.I. Kozonushchenko, <u>V.V. Kislyuk</u> , A.V. Barabanov, O.V. Tretyak, Radiophysics Faculty, Kyiv Taras Shevchenko University, 2/5 Academician Glushkov prospect, 03122 Kyiv, Ukraine
	12:30	LUNCH

Tuesday, June 5, 2001
Mardi 5 juin 2001

Afternoon
Après-midi

Session IIa METHODS FOR STRAIN AND STRESS ANALYSIS

- O-IIa.1** 14:00 Invited PHYSICAL PRINCIPLE AND APPLICATION OF RAMAN SPECTROSCOPY FOR THE ANALYSIS OF STRAINS, STRESSES, AND MICROSTRUCTURAL DEFECTS IN CERAMICS, POLYMERS AND METAL MATRIX COMPOSITES, **Philippe Colomban**, LADIR, UMR 707 CNRS & Université P. et M. Curie, 2 rue Henry Dunant, 94320 Thiais, France
- O-IIa.2** 14:30 RAMAN MAPPING DEVOTED TO THE PHASE TRANSFORMATION AND STRAIN ANALYSIS IN Si MICRO-INDENTATION, **F. Demangeot**, P. Puech, Laboratoire de Physique des Solides, Université Paul Sabatier, 31062 Toulouse Cedex, France, Y.G. Gogotsi, Department of Mechanical Engineering, University of Illinois at Chicago, Illinois 60607-7022, USA, P.S. Pizani, Departamento de Fisica, Universidade Federal de Sao Carlos, 13565-970 Sao Carlos, Brazil, R.G. Jasinevicius, Universidade de Sao Paulo, Escola de Engenharia de Sao Carlos, C.P. 369, 13560-970 Sao Carlos, Brazil
- O-IIa.3** 15:00 ELECTRONIC SPECKLE PATTERN INTERFEROMETRY FOR MICROMECHANICAL MEASUREMENTS, **S. Tamulevicius**, L. Augulis, G. Laukaitis, A. Uzupis Department of Physics, Kaunas University of Technology, Lithuania
- O-IIa.4** 15:30 IN-SITU STRESS MONITORING WITH A LASER-FIBRE SYSTEM, **V. Barrioz**, S.J.C. Irvine, D.P. Jones, Opto-electronic Materials Chemistry, University of Wales, Gwynedd, Bangor, LL57 2UW, UK
- 16:00 **BREAK**
- O-IIa.5** 16:30 DETERMINATION OF RESIDUAL STRESS BY HOLE DRILLING METHOD AND HOLOGRAPHIC & ELECTRONIC SPECKLE PATTERN INTERFEROMETRY MEASUREMENT DATA, **A. Larkin**, A. Apalkov, J. Fontaine, M. Grosmann, I. Odintsev, V. Shchikanov, D. Skulanov, Institution Moscow Engineering Physics Institute, Department Photonics Centre, P.O. Box 31 Kashirskoe Sh., 115409 Moscow, Russia
- O-IIa.6** 17:00 X-RAY DIFFRACTION STUDY OF THIN FILM ELASTIC PROPERTIES, **P. Villain**, P. Goudeau, P.-O. Renault, K.F. Badawi, Laboratoire de Métallurgie Physique, UMR 6630 CNRS, Université de Poitiers, SP2MI, 86962 Futuroscope Chasseneuil, France
- O-IIa.7** 17:30 STRESSES IN MULTILAYERED SYSTEMS: TEST OF THE "SiN₂" METHOD, **D. Chocyk**, A. Proszynski, G. Gladyszewski, Department of Experimental Physics, Institute of Physics, Technical University of Lublin, Poland, S. Labat, P. Gergaud, O. Thomas, Laboratoire TECSSEN UMR CNRS, Faculté des Sciences de St. Jérôme, 13397 Marseille Cedex 20, France
- O-IIa.8** 18:00 ESTIMATION OF BIAXIAL RESIDUAL STRESS IN WELDED STEEL TUBES BY THE BARKHAUSEN NOISE, **M. Lindgren**, T. Lepistö, Tampere University of Technology, Institute of Materials Science, P.O. Box 589, 33101 Tampere, Finland

Wednesday, June 6, 2001
Mercredi 6 juin 2001

Afternoon
Après-midi

Session IIb METHODS FOR STRAIN AND STRESS ANALYSIS

- O-IIb.1** 14:00 Invited MODELLING OF RESIDUAL STRESS DEVELOPMENT IN ELECTRONIC MATERIALS AND DEVICES, **W. Pompe**, Institut für Werkstoffwissenschaft, Technische Universität, Hallwachsstr. 3, 01062 Dresden, Germany
- O-IIb.2** 14:30 STRAIN FIELDS, DISLOCATION STRUCTURES AND PHASE STABILITY IN Al-Li BASE ALLOYS SUBMITTED TO WELDING OPERATIONS, M.C. Macedo, I.G. Solorzano and F.A.I. Darwish, Department of Materials Science and Metallurgy, DCMM, PUC-Rio, Rio de Janeiro, Brazil
- O-IIb.3** 15:00 INVESTIGATION OF MICROMECHANISMS OF PLASTIC DEFORMATION ON A SUBMICRON SCALE BY A NEW PULSE INDENTATION TECHNIQUE, Yurii I. Golovin, Aleksander I. Tyurin, Internationalnaya str., 33, Tambov State University, 392622 Tambov, Russia and Boris Ya. Farber, Zircoa Inc., Cleveland OH, USA
- O-IIb.4** 15:30 CANCELLED
- 16:00 **BREAK**
- O-IIb.5** 16:30 Invited PHYSICAL PRINCIPLES AND APPLICATION OF POSITRON ANNIHILATION FOR THE ANALYSIS OF STRAINS AND THEIR INFLUENCE ON POINT DEFECT DYNAMICS, **D.T. Britton**, University of Cape Town, Department of Physics, ZA-Rondebosch 7701, South Africa
- O-IIb.6** 17:00 APPLICATION OF POSITRON ANNIHILATION LIFETIME TECHNIQUE FOR GAMMA-IRRADIATION STRESSES STUDY IN CHALCOGENIDE VITREOUS SEMICONDUCTORS, J. Filipecki, M. Hyla, O. Shpotyuk, Physics Institute of Pedagogical University, 13/15 Al. Armii Krajowej, Czestochowa 42200, Poland, A. Kovalskiy, R. Golovchak, Scientific Research Company "Carat", 202 Stryjska str., Lviv 79031, Ukraine
- O-IIb.7** 17:30 SPECTROSCOPIC CHARACTERIZATION OF THE ALLOY/ALLOY INTERFACE IN InGaAs/GaAs(001) ASSYMMETRIC QUANTUM WELLS, A. D'Andrea and N. Tomassini, IMAI-CNR, CP 10 Monterotondo Stazione, 00016 Roma, Italy, F. Fernandez-Alonso*, M. Righini and S. Selci, ISM-CNR, via del Fosso del Cavaliere 100, 00133 Roma, Italy, and D. Schiumarini, ICMAT-CNR, CP 10 Monterotondo Stazione, 00016 Roma, Italy
*European Community Marie Curie Postdoctoral Fellow
- O-IIb.8** 18:00 INFLUENCE MOLECULAR STRUCTURE AND TEMPERATURE ON CHAIN RUPTURE UNDER DEFORMATION OF ORIENTED LINEAR POLYETHYLENE, Ulmas Gafurov, Institute of Nuclear Physics, Tashkent 702132, Uzbekistan

Thursday, June 7, 2001
Jeudi 7 juin 2001

Morning
Matin

Session III EFFECTS OF STRAINS AND STRESSES

- O-III.1** 08:30 STRESS EFFECTS AS A FACTOR DETERMINING THE STRUCTURE AND PROPERTIES OF POROUS LAYERS FORMED DURING ELECTROCHEMICAL ETCHING OF METALS AND SEMICONDUCTORS, V. Parkhutik, E. Rayon, Alcoy Higher School of Engineering, Technical University of Valencia, Paseo de Viaducto 1, 03801 Alcoy, Spain
- O-III.2** 09:00 ANALYSIS OF RESISTANCE TO THERMAL STRESS IN CERAMIC OXIDE NUCLEAR MATERIALS, S.C. Lee, C.Y. Joung, H.S. Kim, Y.W. Lee, Korea Atomic Energy Research Institute, Yonsei University, Taejon, Korea
- O-III.3** 09:30 STRAIN RATE SENSITIVITIES OF ZrO₂ CERAMICS NANOHARDNESS, Yurii I. Golovin, Vladimir I. Ivolgin, Viktor V. Korenkov, Internationalnaya str. 33, Tambov State University, 392622 Tambov, Russia and Boris Ya. Farber, Zircoa Inc., Cleveland OH, USA
- O-III.4** 10:00 THE THERMAL STRESS IN InGaAs QUANTUM WELLS, G. Tomaka(1), E.M. Sheregii(1) T. Knkol(1), W. Strupinski(2) A. Jasik(2), R. Jakieno(2) and K. Kosiel(2), (1)Pedagogical University, Rejtana 16a, Poland; (2)Institute of Electronics Technology, Wolczynska 133, Warsaw, Poland
- 10:30 **BREAK**
- 11:00 **POSTER SESSION**
- O/P01** STRAIN RELAXATION IN InP HETEROEPITAXIAL LAYERS GROWN ON (001) AND (111) SURFACES OF GaAs SUBSTRATES BY MOCVD, M.B. Derbali, IPEIMonastir, Tunisia, P. Abraam, LMI, Université Lyon I, France
- O/P02** STRESSES IN LASER-PULSED SINGLE CRYSTALLINE CHROMIUM FILMS TRACKED BY NANOSECOND TRANSMISSION ELECTRON MICROSCOPY, O. Bostanjoglo and H. Dömer, Optisches Institut der TU Berlin, Strasse des 17. Juni 135, 10623 Berlin, Germany
- O/P03** DETERMINATION OF DEFORMATION INDUCED BY THIN FILM RESIDUAL STRESS IN STRUCTURES OF MILLIMETRE SIZE, I.E. Lukacs(1), Zs. Vizvary(2), P. Furjes(1), E. Riesz(1), Cs. Ducsi(1) and I. Barsony(1), (1)Hungarian Academy of Sciences, Research Institute for Technical Physics and Materials Science, P. O. Box 49, 1525 Budapest, Hungary, (2)Budapest Univ. of Technology and Economics, Department of Applied Mechanics, Moegyetem rakpart 3, 1111 Budapest, Hungary
- O/P04** INFLUENCE OF MECHANICAL STRESSES ON NUCLEATION AND CRYSTALLIZATIONS IN THIN a-Si:H FILMS, V.A. Volodin, M.D. Efremov, S.A. Kochubei, L.I. Fedina, Institute of Semiconductor Physics SB RAS, pr.Lavrentjeva 13, Novosibirsk 630090, Russia, V.V. Bolotov, Institute of Sensor Microelectronics SB RAS, pr.Mira 55a, Omsk 644077, Russia, A.V. Kretinin, Novosibirsk State University, 630090, Pirogova 2, Novosibirsk, Russia
- O/P05** STRAIN EFFECT ON TRANSPORT PROPERTIES IN BULK CdTe MONOCRYSTALS, G. Khlyap, State Pedagogical University, 24 Franko str., Drogobych, 82100, Ukraine
- O/P06** THERMOELECTRICAL STRESSES IN MANGANITE-BASED ELECTROCERAMICS, O. Shpotyuk(a), O. Mrooz(a), M. Vakiv(a), I. Hadzaman(a), H. Altenburg(b), J. Plewa(b), (a)Scientific Research Company "Carat", 202 Stryjska Str., Lviv 79031, Ukraine, (b)Fachhochschule Münster, University of Applied Sciences, Stegerwaldstrasse 39, 48565 Steinfurt, Germany
- O/P07** INVESTIGATIONS OF A NEW NANOSTRUCTURED Si-MATERIAL BY SPECTRAL RESPONSE AND ELECTRON PARAMAGNETIC RESONANCE, Z.T. Kuznicki(1), M. Ley(1), P. Turek(2), M. Bernard(2), (1)Laboratoire PHASE, CNRS UPR 292, 23 rue du Loess, 67037 Strasbourg cedex 2, France, (2)Institut Charles Sadron, 6 rue Boussingault, 67083 Strasbourg cedex, France

- O/P08** PHOTOLUMINESCENCE STUDIES OF MICRODEFECTS CREATED AT HIGH TEMPERATURES - PRESSURES IN SILICON IMPLANTED WITH HELIUM / OXYGEN, L. Bryja, J. Misiewicz, Institute of Physics, Wrocław University of Technology, Wybrzeże Wyspiańskiego 27, 50-370 Wrocław, Poland, A. Misiuk, M. Prujarczyk, Institute of Electron Technology, Al.Lotników 46, 02-668 Warsaw, Poland; V. Raineri, CNR-IMETEM, Stradale Primasole 50, 95121 Catania, Italy; I.V. Antonova, Institute of Semiconductor Physics, RAS, Lavrentieva 13, 630090 Novosibirsk, Russia; J. Bak-Misiuk, Institute of Physics, PAS, Lotników 46, 02-668 Warsaw, Poland
- O/P09** LOW TEMPERATURE ANOMALY IN RESISTANCE NANOWIRE BI-WIRE IN CONDITION OF STRONG ELASTIC DEFORMATION, A. Nikolaeva(1,2), D. Gitsu(1), A. Burchakov(1), E. Moloshnik(1), (1)Institute of Applied Physics, Kishinev, Moldova, (2)International Laboratory of High Magnetic Fields and Low Temperatures, Wrocław, Poland
- O/P10** AT THE MECHANISM OF THE PHENOMENA TRANSFORMATION ON THE BASIS DEPENDENCIES T-c IN THE SYSTEM Ge_{1-x}Pb_xTe AT MODEL CLUSTER, V.G. Pavlov, Moscow State Institute of Electronic Engineering Physical Chemistry, k.808-144, 103527 Moscow, Russia
- O/P11** STRAIN INFLUENCE ON FORMATION OF DIFFERENT CoSi₂ PRECIPITATES FABRICATED BY ION BEAM SYNTHESIS, Yu.N. Parkhomenko, D.A. Podgorny, K.D. Chitchebachev, E.A. Vygovskaya, Moscow State Institute of Steel and Alloys, Leninskii pr. 4, 117936 Moscow, Russia

12:30

LUNCH

Thursday, June 7, 2001
Jeudi 7 juin 2001

Afternoon
Après-midi

**session IV STRAINS DUE TO LATTICE DEFECTS AND
ORDER/DISORDER PHENOMENA**

- O-IV.1** 14:00 RELAXATION OF ATOMS IN TUNGSTEN S3<111> GRAIN BOUNDARY WITH AND WITHOUT BORON INTERSTITIALS, Kleber C. Mundim, Inst Phys, FUB, Salvador, Brazil; Vlad Liubich and David Fuks, Dept Mater Eng, BGU, POB 653, 84105 Beer-Sheva, Israel; Simon Dorfman and Joshua Felsteiner, Dept Phys, Technion, 32000 Haifa, Israel; Gunnar Borstel, Dept Phys, Uni Osnabrueck, 49069 Osnabrueck, Germany
- O-IV.2** 14:30 RESIDUAL STRESS IN COPPER CONTAINING A HIGH CONCENTRATION OF KRYPTON PRECIPITATES, M. Yaman, D.T. Britton, M. Härting, University of Cape Town, Department of Physics, ZA-Rondebosch 7701, South Africa
- O-IV.3** 15:00 ELASTIC ANISOTROPY EFFECT ON THE STABILITY OF A SUBGRAIN BOUNDARY DEFECT IN A C16 CRYSTAL, C.H. Belgacem(a), M. Fnaiech(a), M. Loubradou(b), S. Lay(b), R. Bonnet(b), (a)Laboratoire d'Analyse Structurale des Matériaux, Faculté des Sciences de Monastir, Monastir 5000, Tunisie, (b)Institut National Polytechnique (LPTCM,CNRS)/ENSEEG, Domaine universitaire, BP 75, 38402 Saint Martin d'Hères, France
- O-IV.4** 15:30 ELECTRON PARAMAGNETIC RESONANCE IN STRUCTURAL DEFECTS AS A NEW FACTOR OF NON-THERMAL CONTROL OVER RELAXATION RATE OF RESIDUAL STRESSES, Roman B. Morgurov, Yurii I. Golovin, Tambov State University, 33 Internationalnaya str., 392622 Tambov, Russia
- 16:00 **BREAK**
- O-IV.5** 16:30 COMPUTED T.E.M IMAGES OF A RECTILINEAR DISLOCATION PARALLEL TO THE FREE SURFACES OF AN ANISOTROPIC PLATE, S. Ben Youssef, A. Boussaïd, M. Fnaiech and R. Bonnet(a), Laboratoire d'Analyse Structurale des Matériaux, Faculté des Sciences de Monastir, 5000-Monastir, Tunisie, (a)INPG/UJF, Laboratoire de Thermodynamique et Physico-Chimie Métallurgiques (UMR 5614)/ENSEEG, Domaine Universitaire, BP 75, 38402 Saint Martin-d'Hères, France
- O-IV.6** 17:00 THE STRESSES CAUSED BY INCLUSIONS IN CdTe, HgTe, CdHgTe AND RELATED EFFECTS, I.V. Kurilo, I.O. Rudyj, National University "Lviv Polytechnic", 12 Bandera str., 79013 Lviv 13, Ukraine, A.I. Vlasenko, Institute of Semiconductor Physics NAS Ukraine, 45 Prospect Nauky, 01028 Kyiv 28, Ukraine, I.S. Virt, Pedagogical University, 24 Franko str., 79720 Drohobych, Ukraine
- O-IV.7** 17:30 ELECTRICAL AND STRUCTURAL PROPERTIES OF OXYGEN -CONTAINING SILICON ANNEALED AT 670-1000 K UNDER HIGH STRESS, A. Misiuk, Institute of Electron Technology, Al. Lotnikow 46, 02-668 Warsaw, Poland, I.V. Antonova, Institute of Semiconductor Physics, RAS, 630090 Novosibirsk, Russia and J. Bak-Misiuk, Institute of Physics, PAS, 02-668 Warsaw, Poland
- O-IV.8** 18:00 CANCELLED

Friday, June 8, 2001
Vendredi 8 juin 2001

Morning
Matin

Session V STRAINS AND STRESSES IN THIN FILMS

- O-V.1** 08:30 ELASTIC DEFORMATIONS IN THIN FREESTANDING FERROELECTRIC FILMS, Jaya Nair and Igor Lubomirsky, Dept. of Materials and interfaces, Weizmann Institute of Science, Rehovot 76100, Israel
- O-V.2** 09:00 INVESTIGATION OF STRESS STATES IN CVD-GROWN DIAMOND LAYERS, R. Bucher, M. Hempel, M. Härting, University of Cape Town, Department of Physics, ZA-Rondebosch 7701, South Africa
- O-V.3** 09:30 INFLUENCE OF THE STRAIN ON THE ELECTRICAL RESISTANCE OF ZINC OXIDE DOPED THIN FILM DEPOSITED ON POLYMER SUBSTRATES, E. Fortunato, P. Nunes, I. Ferreira, H. Aguas and R. Martins, Department of Materials Science/CENIMAT, Faculty of Sciences and Technology, New University of Lisbon and CEMOP-UNINOVA, 2825-114 Caparica, Portugal
- O-V.4** 10:00 DEPENDENCE OF THE STRAIN AND RESIDUAL MECHANICAL STRESSES ON THE PERFORMANCES PRESENTED BY a-Si:H THIN FILM POSITION SENSORS, E. Fortunato, P. Nunes, I. Ferreira, H. Aguas and R. Martins Department of Materials Science/CENIMAT, Faculty of Sciences and Technology, New University of Lisbon and CEMOP-UNINOVA, 2825-114 Caparica, Portugal
- 10:30 **BREAK**
- O-V.5** 11:00 THERMAL ANNEALING OF HEXAGONAL AND CUBIC BORON NITRIDE FILMS, A. Soltani(3), M. A. Djouadi(1,2), V. Mortet(1), P. Thevenin(4) and A. Bath(3), (1)Ecole Nationale Supérieure d'Arts et Métiers, 71250 Cluny, France, (2)Institute of Applied Physics, EPFL, 1015, Lausanne, Switzerland, (3)Université de Metz, MOPS SUPELEC, 57078 Metz, France
- O-V.6** 11:30 ELASTIC PROPERTIES OF ANISOTROPIC FCC AND BCC CUBIC OVERLAYERS, H.W. Kunert, J. Malherbe, Department of Physics, University of Pretoria, 0002 Pretoria South Africa and E.N. Lavitska, Polytechnic University, Kotlarevski Street 1, 79013 Ukraine
- O-V.7** 12:00 CANCELLED
- 12:30 **FAREWELL ADDRESS**